Milestone MS25: Access cost analysis

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Content

1. Scope of this document

ACTRIS is, to date, one of the rare distributed environmental RIs aiming at offering - additionally to free ACTRIS data and tools - various other services, such as use of state-of-the-art research instruments and equipment, opportunities to perform scientific experiments, field campaigns, inter-comparison exercises, technical and innovation services (e.g., calibrations, instrument testing and development), expert support, training and capacity building, as well as specific or tailored Data Centre services.

Explicit efforts are required by the ACTRIS Central Facilities (CF) and National Facilities (NF) to provide access to these services.

The main objective of this working document is to describe the proposed methodology for analysing and better understanding the access costs, i.e., the costs that incur for providing access to services, and the factors which have the greatest influence on them (i.e. the cost drivers). Even if there is no costing methodology which can be applied universally, the proposed methodology should be referred to as an instructive guide to the factors which should be taken into account when carrying out the costing exercise.

The cost information provided by the facilities will form the base for the analysis and recommendations that will be delivered in the *D6.2: Report on access cost model and recommendations for pricing scheme related to access services*, with the aim of establishing the principles and mechanism for ensuring the long-term sustainability of ACTRIS service provision.

2. Access to ACTRIS Services

The overall aim of ACTRIS is to provide **open and easy access to resources and services to all users** [3,4] to conduct excellent research, foster innovation and provide high-quality information for society, allowing to address societal challenges related to air quality, climate change and health.

An ACTRIS User is a person, a team, or an institution making use of ACTRIS data or other ACTRIS services, including access to ACTRIS facilities [1]. A more complete segmentation of the user categories is already covered [5] and will be further developed during the implementation phase.

ACTRIS offers different services which include: 1) access to ACTRIS data and digital tools; 2) access to ACTRIS Facilities; and 3) access to training services and capacity building.

The access to ACTRIS services will be based on principles that are defined in the ACTRIS data policy and ACTRIS access and service policy, both approved by ACTRIS Interim ACTRIS Council (IAC) delegates. Access to ACTRIS services comprises two types of access:

1) <u>virtual access</u>, which is open and free access to users to ACTRIS data, digital tools, training and other ACTRIS services offered by ACTRIS through the ACTRIS DC or access to ACTRIS tools offered through a ACTRIS TC;

2) <u>physical and remote access</u>, which is open access to services offered by the ACTRIS Central Facilities (CF) or National Facilities (NF) with or without users physically accessing the facility. All Topical Centres

(TC) and the Data Centre (DC) shall provide either physical or remote access or both. The level of access provision may vary between CFs. The NF, both observational and exploratory platforms, may also provide physical or remote access to their instrumented platforms. Being equipped with state-of-the-art instruments that follow recommended ACTRIS operation standards, instrumented platforms can be accessed by users, e.g., to run scientific experiments and campaigns and study atmospheric processes, for testing, comparing and calibrating instruments, for developing new observation techniques and for exploring instrument synergies, or training purposes.

The provision of services via physical and remote access is generally bound by a limited CF and NF capacities. Being dependent on the facilities' capacities, physical and remote access is considered competitive and it is based on a selection process via SAMU (Service Access Management Unit).
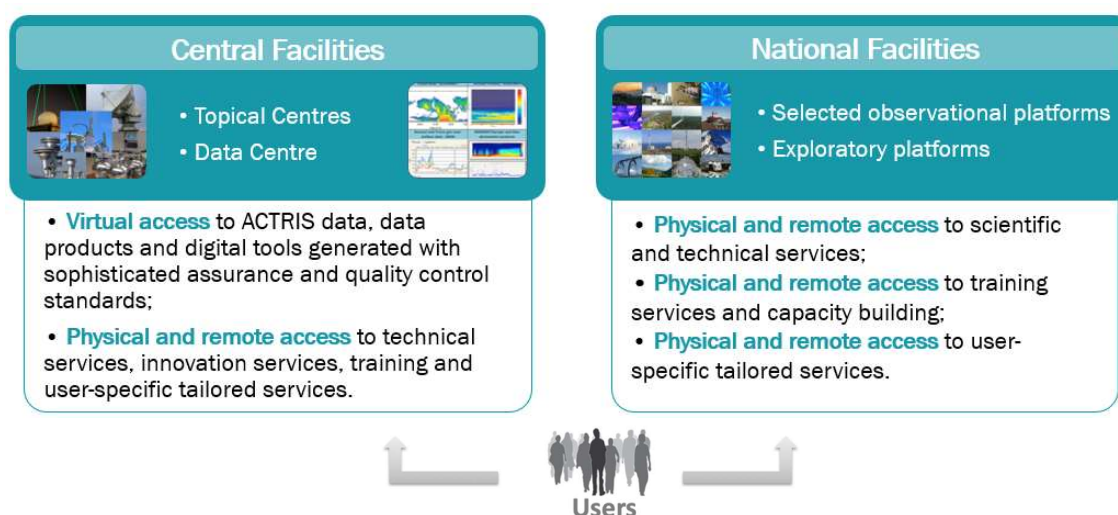

Figure 1: Illustration of access to ACTRIS CF and NF services scheme.

3. Methodology for calculating access costs for ACTRIS Services

All access to ACTRIS services, be it virtual, physical or remote, induces costs. Access costs are part of the full operating costs that facilities incur to carry out their activities. A clear identification and estimation of the access costs is fundamental for studying the feasibility and ensuring the sustainability of the provision of the services to users, supporting decision making in adopting the right plan for funding access, staying competitive and creating a value perception for the users.

The estimation of the operating cost incurred for providing the services will be given by the access providers (i.e. the research performing organisations (RPO) hosting CF or NF) according to the methodology proposed in this document and taking into account the specific accounting rules of each organization.

Basic rules and assumptions to consider for the estimation of the access costs are the same as those applied for the preparation of the ACTRIS Cost Book [2]. Latter document is a valid methodology reference for estimating the access costs, as it addresses all costs (and categories) required for ACTRIS operations, cost exclusions and inclusions, techniques for developing accurate estimates, description of the main cost items to be considered, etc.

The details of the access costing exercise will depend on the nature of the service being provided to users and on the provider.

3.1. Defining the services provided to users

Developing an unambiguous description of the ACTRIS services offered for the users' access is an essential prerequisite to the costing exercise. Without a clear definition of the services it would be impossible to identify and estimate the access costs.

The following consideration should be considered to describe the services provided to users:

- Has the service already been provided in the past? To how many users? What is their origin (geographical, academic …) or can they be classified?
- How many users are planned to be served? What type of access?
- Who is responsible for the service?
- Timelines for preparing and providing the access
- The modalities of access and use of service
- The unit of access that measure the service
- Estimate the average annual quantity of access provided
- The type of support included in the service
- Obligations and requirements

This information should be part of specific Implementation plan of Facilities or addressed in the Catalogue of services.

3.2. Key components of access costs

Access costs comprise all those costs incurred by the ACTRIS Central Facilities and National Facilities for providing a service to users.

To obtain the full cost of each service and the total value of benefits that the users gain from the access, the calculation of access costs should be based on a **full cost methodology** to cover both **operating costs and capital investments**.

Operating costs are the regular, usual and customary recurring costs of operating the equipment and facilities for providing the access to users.

Capital investments are tangible and intangible assets needed to provide access to users and having a minimum useful lifetime, for example:

- Equipment;
- Buildings and space of the facilities;
- Other (vehicles, furniture, etc.).

Depending on the type of costs and level of details, access costs can be classified into direct / indirect cost and fixed / variable costs.

3.2.1. Direct and indirect access costs

Direct costs and indirect costs are based on the relationship or degree of traceability to the services provided.

To determine whether a cost is a direct or indirect cost, each provider should carefully consider if they need that cost for providing a specific service to users or for day-to-day operations.

➢ **Direct access costs**

Direct access costs are costs that can be easily identified and allocated to the provision of each specific service. For example:

- Costs of technical and scientific personnel directly assigned to the planning, preparation, and functioning of the facility for the provision of access (before, during, and after) and to support the users with training, scientific expertise, and other on-site needs;
- Costs of personnel for administrative support and logistics (including customs, shipping and transport of instrumentation, arrangements of travel and accommodation, etc.);
- Travel costs of facility staff for the provision of services;
- Transport costs of any equipment needed by the access provider to deliver the services;
- Consumables costs for the provision of services (e.g. technical gases, chemicals, filters, tools and small consumable items, spare parts, other maintenance and repair costs, computing and communication costs, etc.);
- Other costs directly related to the provision of services.

Direct access costs are actual costs necessary for the provision of services to the users. Depending on the case, direct access costs could also include some expenses that are generally considered as indirect access costs. It is the case of expenses that are specifically needed for the provision of a service to users. It could be, for example, a relevant cost for utilities consumption specifically needed to operate certain big installation; or the rental for a space that is only dedicated to the provision of a service; or the maintenance of an equipment that is only dedicated to users' access; etc.

Anyway, being unequivocally traceable to the provision of each service, the allocation of direct access costs is simple because it is already clear to which services these expenses have gone. They can be

identified by the scientific experts and estimated through the support of administrative/accounting personnel at the hosting RPO.

➢ **Indirect access costs**

Indirect access costs are general expenses incurred by the usage of shared resources for the entire operations of a facility; therefore, they are not directly traceable to the provision of ACTRIS services to users. Indirect access costs, however, are needed for allowing the access as a whole and must, therefore, be identified and accounted for. Indirect costs can include, for example:

- Rental of spaces;
- Utilities (water, electricity, gas etc.);
- General administration, accounting and legal expenses;
- General expenses for office, security, computing, data processing, telephone, etc.;
- Maintenance and insurance;
- Other expenses.

Indirect costs must be properly identified, calculated and apportioned between the services provided to users and other operation of the providing facility. This action is usually performed according to the accounting rules of the RPO hosting the CF and NF providing the access.

3.2.2. Fixed and variable access costs

Access costs are classified into fixed and variable costs as a function of the quantity of access provided.

Cost	In total	Per unit of access
Fixed costs	Total fixed cost remains unchanged over a period of time whatever the quantity of access provided.	Fixed cost per access goes down as the quantity of access provided increases. And vice versa.
Variable costs	Total variable cost changes as quantity of access provided changes: when the quantity of access increases, these costs increase, and vice versa.	Variable cost per unit of access remains the same whatever the quantity of access provided.

Table 1: Access costs as a function of the quantity of access provided

Direct access costs are mostly variable costs, being dependant on the quantity of access provided. A general classification of access costs is illustrated in figure 2.

Nevertheless, access costs must be assessed and accounted for on a case by case basis, as different classifications could apply for different services or different RPOs hosting the CF and NF providing the access.

In the final analysis, the identification of the variable costs is of particular importance, as they may represent a significant fraction of the access costs and should then be properly considered and referred to when making consideration on the scalability of the service capacity

Figure 2 Example of a general classification of the access costs

3.3. Cost estimating techniques

Depending on the information and details available, costs estimates can be provided using a combination of estimation techniques and levels of accuracy.

While deterministic estimating techniques such as bottom-up estimating are undoubtedly the most accurate since they look at costs from a more granular perspective, they can also be time-consuming. Analogous estimating or expert judgment, also called top-down estimating, are reasonably quick and could also provide accurate figures as experts can precisely evaluate the factors affecting the access costs and know how much similar the provision of a service has cost in the past.

In any case, access costs should be estimated as **actual costs** that are:

- necessary for the provision to the selected users;
- identifiable, verifiable and recorded in the access provider's accounts;
- reasonable, justified and sound.

3.4. Access costs estimation

Following the methodology described in this document, access cost estimates can be easily developed using spreadsheets and formulas.

Any used tool should break down the operational scope of the providing facility into the services that can be given for the users' access. For each service, it should allow to:

- Clearly describe the provider(s)
- Define the unit of access that measures the service provided (e.g. 1 service provided, 1 hour, 1 day, etc.)
- Estimate the actual required effort (person/months) and cost of the staff per each unit of access
- Estimate the actual other direct and variable costs required per each unit of access (e.g. consumables, travel, transport, other direct, etc.)
- Estimate the fixed cost (e.g. indirect costs) that is allocated to the service

Depending on the provider and/or the service, the access costs could also be estimated as unit cost on the basis of historical data, as a function of average access costs and average quantity of access provided by the Central or National Facility over a reference period.

Particular attention has to be given to resources like personnel, equipment, spaces, etc. that should be properly accounted to ensure their availability when planning the provision of services to users and estimating the related costs. For example, where an equipment is used to carry out different activities or provide different services, its availability should be properly estimated and allocated to each service, in order to verify that the full availability of the equipment is not reached and to get the share of the depreciated value that can be allocated to each service.

Finally, in order to expose the full costs to users, an appropriate depreciation charge should be considered as a method to allocate the capital investments to each service provided to users. A common method of determining the depreciation charge is the straight-line method which allocates the cost of the asset over the number of years of useful life. The depreciated value of each asset should then be allocated to the services based on its direct/indirect traceability to them: for example, considering the share of the total equipment availability used by a specific service, for those cases where the same equipment is used to carry out many activities or provide different services.

4. Summary and next steps

All the ACTRIS Facilities aiming at providing services to users have to provide the estimation of their access costs following the common methodology that is initially presented in this document and that will be further developed during the ACTRIS implementation phase

The estimation of the access cost will be only the first step in the analysis of these costs. An extensive validation of the access costs is envisaged during the ACTRIS implementation phase. This validation will be done to verify whether the Facilities are in a position of providing the planned services to ACTRIS users,

and to check that the planned activities are feasible, needed and adequately dimensioned, and that the respective costs are reasonable and well defined.

In-depth studies will follow to define the access cost model that identifies all the pertinent fractions of access costs, together with the overall strategy and framework for funding these costs and sustaining physical and remote access in the ACTRIS operational phase. The sustainability of access within ACTRIS requires an access funding strategy that is tailored to its specific needs.

Although ACTRIS should target free-of-charge access, potential user fees may apply for specific users (e.g., private sector users), for specific user origins (e.g. users from non ACTRIS member/observer countries) or for specific services (e.g., user-specific, tailored services). The objective is to develop efficient user pricing schemes and to explore conditions to ensure that the full cost of providing a service can be accounted for explicitly and recovered at an appropriate level.

5. Reference documents

1. ACTRIS glossary
   https://www.actris.eu/About/ACTRIS/ACTRISglossary.aspx

2. ACTRIS PPP - Deliverable 3.1 - ACTRIS Cost Book including CF, NF and services
   https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP3_D3.1_M24.pdf?ver=2019-01-31-213136-083

3. ACTRIS PPP - Deliverable 6.1 - Recommendations for ACTRIS data policy
   https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP6_D6.1_M18.pdf?ver=2018-06-28-134606-593

4. ACTRIS PPP - Deliverable 6.3 - Report on access rules and modalities and recommendations for ACTRIS access policy
   https://www.actris.eu/Portals/46/Documentation/ACTRIS%20PPP/Deliverables/Public/WP6_D6.3_M30.pdf?ver=2018-12-21-142012-007

5. ACTRIS PPP – Milestone 23 - Definition of user requirements